NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

FILTER STRIP
(ACRE)

CODE 393

DEFINITION

A strip or area of herbaceous vegetation situated between cropland, grazing land, or disturbed land (including forestland) and environmentally sensitive areas.

PURPOSE

- To reduce sediment, particulate organics, and sediment adsorbed contaminant loadings in runoff.
- To reduce dissolved contaminant and pathogen loadings in runoff.
- To convert concentrated flow and trap sediment in Zone 3 of a Riparian Forest Buffer Standard (Code 391).
- To reduce sediment, particulate organics, and sediment adsorbed contaminant loadings in surface irrigation tailwater.
- To restore, create, or enhance herbaceous habitat for wildlife and beneficial insects.
- To maintain or enhance watershed functions and values.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies (1) in areas situated below cropland, grazing land, or disturbed land (including forest land); (2) where sediment, sediment adsorbed contaminants, particulate organic matter, and/or dissolved contaminants may leave these areas and are entering environmentally sensitive areas. Environmentally sensitive areas include streams, lakes, ponds, wetlands, sinkholes (karst), and other water bodies.

CRITERIA

General Criteria Applicable to All Purposes

Filter strips shall be designated as vegetated areas to treat runoff and are not part of the adjacent cropland rotation.

Overland flow entering the filter strip shall be primarily sheet flow. Concentrated flow shall be dispersed with additional conservation measures.

Location

Filter strips shall be installed approximately on the contour, unless other conservation measures will provide sheet flow.

All trees, stumps, brush, rocks, and similar materials that can interfere with installing the filter strip shall be removed. The materials shall be disposed of in a manner that is consistent with the standards for maintaining and improving the quality of the environment and with proper functioning of the filter strip.

The filter strip shall be shaped to grade and dimensions as shown on the plan or as staked in the field. If necessary, topsoil shall be stockpiled and spread to the required grade and thickness. Excess spoil shall be disposed of in areas where it does not interfere with the required flow characteristics of the filter strip.

Filter Strip Location Requirements:

(a) The filter strip shall be located along the downslope edge of a field or disturbed area. To the extent practical, it shall be placed on the approximate contour. Variation in placement on the contour should not exceed a 0.5 percent gradient (perpendicular to the flow length).

(b) Filter strips shall be established on average slopes of 10 percent or less.

(c) The ratio of the drainage area to the filter strip area shall not exceed 50:1 (e.g., 0.5-acre filter strip area has no more than 25-acre drainage area).

(d) At least 50 percent of the drainage area should pass through the filter strip as sheet flow rather than by field ditches or concentrated flow points.

(e) The average annual sheet and rill erosion rate above the filter strip shall be less than ten (10) tons per acre per year.

Vegetation

Plant species shall be adapted to soil-site conditions, suitable for the planned purpose, and capable of reducing flow velocities.

Plant heights at maturity shall be greater than the anticipated depth of flow from upland runoff across the filter strip.

Seeding rates will be adequate to accomplish the planned purpose. Planting dates and care in handling and planting of the seed will ensure that planted materials have an acceptable rate of survival. Site preparation shall be sufficient for establishment and growth of the planted materials.

The filter strip shall be established to permanent herbaceous vegetation consisting of a single species or a mixture of grasses, legumes, and/or other forbs adapted to the soil, climate, nutrients, chemicals, and practices used in the current management system. Stem density shall be such that the stem spacing does not exceed one (1) inch.

Filter strip establishment shall comply with local, state, and federal regulations.

Additional Criteria to Reduce Sediment, Particulate Organics, and Sediment-Adsorbed Contaminant Loadings in Runoff

Filter strip flow length shall be determined based on field slope percent and length and filter strip slope percent, erosion rate, amount and particle size distribution of sediment delivered to the filter strip, density and height of the filter strip vegetation, and runoff volume associated with erosion producing events. The minimum flow length for this purpose shall be 20 feet. The minimum flow length shall be increased by

at least five (5) feet for each of the following applicable site conditions:

(a) Majority of filter strip installed on soils in hydrologic group D.

(b) Majority of filter strip installed on average slopes of 5 percent or greater.

(c) Drainage area above filter strip exceeds 30:1 ratio.

Additional Criteria to Reduce Dissolved Contaminants and Pathogens in Runoff

The criteria given in "Additional Criteria to Reduce Sediment, Particulate Organics, and Sediment Adsorbed Contaminant Loadings in Runoff" also apply to this purpose.

Filter strip flow length required to reduce dissolved contaminants (e.g., wastewater) in runoff shall be based on management objectives, contaminants of concern, and the volume of runoff from the filter strip's drainage area compared with the filter strip's area and infiltration capacity.

The minimum flow length for this purpose shall be 30 feet. The minimum flow length shall be increased by at least 10 feet for each of the following applicable site conditions:

(a) Majority of filter strip installed on soils hydrologic group D.

(b) Majority of filter strip installed on average slopes of 5 percent or greater.

(c) Drainage area above filter strip exceeds 30:1 ratio.

Additional Criteria to Serve as Zone 3 of a Riparian Forest Buffer, Practice Standard 391

The minimum flow length for Zone 3 shall be 20 feet. The criteria for increasing the flow length for this purpose shall be the same as given in "Additional Criteria to Reduce Sediment, Particulate Organics, and Sediment-Adsorbed Contaminant Loadings in Runoff." Zone 3 shall consist of stiff-stemmed grasses capable of accelerating the deposition of sediment.

Additional Criteria to Reduce Sediment, Particulate Organics, and Sediment Adsorbed Contaminant Loadings in Surface Irrigation Tailwater

Filter strips shall be established early enough prior to the irrigation season so that the vegetation can withstand sediment deposition from the first irrigation.

The flow length shall be based on management objectives.

Additional Criteria to Restore, Create, or Enhance Herbaceous Habitat for Wildlife and Beneficial Insects

If this purpose is intended in combination with one or more of the previous purposes, then the minimum criteria for the previous purpose(s) must be met. Additional filter strip flow length devoted for wildlife must be added to the length required for the other purpose(s).

Any addition to the flow length for wildlife or beneficial insects shall be added to the downhill slope of the filter strip. Vegetation to enhance wildlife may be added to that portion of the filter strip devoted to other purposes to the extent they do not detract from its primary functions.

Plant species selected for this purpose shall be for permanent vegetation adapted to the wildlife or beneficial insect population(s) targeted (See Table 1).

When considering wildlife, filter strip width and length shall be based on requirements of the targeted wildlife or insects. Refer to Upland Wildlife Habitat Management (645).

Density of the vegetative stand established for this purpose should consider targeted wildlife habitat requirements and encourage plant diversity. Dispersed woody vegetation may be used to the extent it does not interfere with herbaceous vegetative growth or operation and maintenance of the filter strip.

A reduction in general seeding rates shall be used for wildlife plantings to create open structure for increased forb production and wildlife movement, but high stem densities shall be established on the up-slope portion required for filtering runoff.

Natural herbaceous vegetation that volunteers may only be used when the ground cover exceeds 80 percent and average plant height at maturity exceeds 6 inches.

That portion of the filter strip planned for wildlife shall not be mowed during the nesting season of the targeted wildlife. The primary nesting season is April 15 to August 15. Restrict mowing to no more than once annually.

Livestock and vehicular traffic in the filter strip shall be excluded during the primary nesting or fawning season (April through August).

Additional Criteria to Maintain or Enhance Watershed Functions and Values

Filter strips shall be strategically located to enhance connectivity of corridors and non-cultivated patches of vegetation within the watershed.

Filter strips should be strategically located to enhance aesthetics of the watershed.

Plant species selected for this purpose shall be for establishment of permanent native vegetation.

CONSIDERATIONS

Consider avoiding establishment of filter strips on slopes of less than 1 percent. Higher than normal maintenance can result from excessive ponding and accelerated sedimentation.

Filter strips should be strategically located to reduce runoff and increase infiltration and ground water recharge throughout the watershed.

To avoid damage to the filter strip, consider using vegetation that is somewhat tolerant to herbicides used in the up-slope crop rotation. Many of the herbicide labels may provide a list of tolerant plant species.

Consider using this practice to enhance the conservation of declining species of wildlife, including those that are threatened and endangered.

Consider using this practice to protect National Register listed or eligible (significant) archaeological and traditional cultural properties from potential damaging contaminants.

Filter strip size should be adjusted to a greater flow length to accommodate harvest and maintenance equipment.

To maximize filtering capacity of sediment, consider establishing the first three feet from the crop field edge to native grasses or other stiff, upright stem species.

PLANS AND SPECIFICATIONS

Based on this standard, plans and specifications shall be prepared for each specific field site where a filter strip will be installed. A plan includes information about the location, construction sequence, vegetation establishment, and management and maintenance requirements.

Specifications will include:

(a) Length, width, and slope of the filter strip to accomplish the planned purpose (width generally refers to flow length across the filter strip).

(b) Species selection and seeding or sprigging rates to accomplish the planned purpose. Use critical area seeding rates for all purposes except for any portion of the strip designed solely for wildlife habitat.

(c) Planting dates, care, and handling of the seed to ensure planted materials have an acceptable rate of survival.

(d) A statement that only viable, high quality, and regionally adapted seed will be used.

(e) Site preparation sufficient to establish and grow selected species.

(f) All engineering designs and specifications for any planned structures for spreading and creating shallow sheet flow (e.g., berms, drop structures, etc.).

OPERATION AND MAINTENANCE

For the purposes of filtering contaminants, permanent filter strip vegetative plantings should be harvested as appropriate to encourage dense growth and maintain an upright growth habit. Filter strips designed to remove nutrients and other contaminants by means of plant uptake should be harvested for hay periodically (two to three times during growing season).

To remove pathogens from runoff, maintain minimum plant heights to increase exposure of the pathogens to sunlight and desiccation.

Control undesired weed species, especially those considered noxious weeds.

Prescribed burning may be used to manage and maintain the filter strip when an approved burn plan has been developed.

Inspect the filter strip after major storm events and repair any gullies that have formed. Remove unevenly deposited sediment accumulation that will disrupt sheet flow, reseed disturbed areas, and take other measures to prevent concentrated flow through the filter strip. Remove sediment accumulation when six (6) inches have occurred.

Apply supplemental nutrients as needed to maintain the desired species composition and stand density of the filter strip. Evaluate the need for lime and fertilizer when fertilizing the remainder of the field and according to soil test recommendations.

To maintain or restore the filter strip's function, periodically regrade the filter strip area when sediment deposition at the filter strip-field interface jeopardizes its function, and then reestablish the filter strip vegetation, if needed. If wildlife habitat is a purpose, destruction of vegetation within the portion of the strip devoted to that purpose should be minimized by regrading only to the extent needed to remove sediment and fill concentrated flow areas.

Grazing shall not be permitted in the filter strip unless a controlled grazing system is being implemented. Grazing will be permitted only when soil moisture conditions support livestock traffic without excessive compaction. Avoid overgrazing, grazing during wet periods, buildup of manure, and traffic paths.

When grazing or haying a filter strip, maintain a minimum height of 4 inches for introduced grasses and 8 inches for native warm season grasses.

TABLE 1. LIST OF POSSIBLE PLANT MATERIALS CONSIDERED SUITABLE FOR FILTER STRIPS (NOT TO BE CONSIDERED A COMPLETE LIST) [1/]

SEED OR PLANTS	SEEDING RATE PER ACRE	SEEDING DATE	WILDLIFE Food	WILDLIFE Cover	SPECIES BENEFITED
Natural Vegetation[2/]	N/A	N/A	X	X	Small Game, Songbirds, Insects
Orchardgrass (CRP Approved Only)	20 lbs.	Feb. 20-Apr. 1 Aug. 15-Oct. 1	X		Turkey, Rabbit
Orchardgrass Timothy Korean Lespedeza (CRP Approved Only)	7 lbs. 4 lbs. 8 lbs.	Feb. 20-Apr. 1 Aug. 15-Oct. 1	X	X	Turkey, Quail, Rabbit
Orchardgrass Timothy Kobe Lespedeza (CRP Approved Only)	7 lbs. 4 lbs. 15 lbs.	Feb. 20-Apr. 1 Aug. 15-Oct. 1	X	X	Turkey, Quail, Rabbit
Orchardgrass Korean Lespedeza (CRP Approved Only)	14 lbs. 8 lbs.	Feb. 20-Apr. 1 Aug. 15-Oct. 1	X		Turkey, Quail, Rabbit
Orchardgrass Kobe Lespedeza (CRP Approved Only)	14 lbs. 15 lbs.	Feb. 20-Apr. 1 Aug. 15-Oct. 1	X		Turkey, Quail, Rabbit
Bermudagrass Sprigs: Tifton 44, Midland, Coastal [3/] [5/] (CRP Approved Only)	20-30 cu. ft. (Machine) 15-20 cu. ft. (Other Method)	May 1-July 1			
Common Bermuda	10 lbs.	May 1-July 1			
Fescue	50 lbs.	Feb. 20-Apr. 1 Aug. 15-Oct. 1			
Fescue Kobe Lespedeza (CRP Approved Only)	14 lbs. 15 lbs.	Feb. 20-Apr. 1			
Fescue Korean Lespedeza (CRP Approved Only)	14 lbs. 8 lbs.	Feb. 20-Apr. 1			
Fescue Timothy Kobe Lespedeza (CRP Approved Only)	7 lbs. 4 lbs. 15 lbs.	Feb. 20-Apr. 1			
Fescue	7 lbs.	Feb. 20-Apr. 1			

Timothy **Korean Lespedeza** **(CRP Approved Only)**	**4 lbs.** **8 lbs.**				
Switchgrass [6/]	**15 lbs. (PLS)** [4/]	**Dec. 1-July 1**		**X**	**Turkey, Quail, Deer**
Tall Fescue **Sericea Lespedeza**	**20 lbs.** **40 lbs.**	**March 15-May 1**			

TABLE 1 (CONTINUED). LIST OF POSSIBLE PLANT MATERIALS CONSIDERED SUITABLE FOR FILTER STRIPS (NOT TO BE CONSIDERED A COMPLETE LIST) [1/]

SEED OR PLANTS	SEEDING RATE PER ACRE	SEEDING DATE	WILDLIFE Food	WILDLIFE Cover	SPECIES BENEFITED
Tall Fescue White Clover	40 lbs. 2 lbs.	Feb. 20-Apr. 1 Aug. 15-Sept. 15			
Reed Canarygrass	25 lbs.	Aug. 15-Oct. 1 Feb. 15-Apr. 1			
Switchgrass Big Bluestem Indiangrass	5 lbs. (PLS) 5 lbs. (PLS) 5 lbs. (PLS)	Dec. 1-July 1		X	Deer, Quail, Turkey, Rabbit, Songbirds
Switchgrass Big Bluestem Illinois Bundleflower Partridge Pea	5 lbs. (PLS) 5 lbs. (PLS) 1 lb. 3 lbs.	Dec. 1-July 1	X	X	Deer, Quail, Turkey, Rabbit, Songbirds
Eastern Gamagrass Switchgrass	10 lbs. (PLS) 7 lbs. (PLS)	Dec. 1-July 1		X	Deer, Quail, Turkey, Rabbit, Songbirds
Switchgrass Kobe or Korean Lespedeza	10 lbs. 5 lbs.	March 1-June 1	X	X	Deer, Quail, Turkey, Rabbit, Songbirds

[1/] All seeding rates in this table are high for filtering purposes. Wildlife mixture seeding rates should be lower than in this table for portions of a filter strip developed solely for wildlife. Refer to TN 2-CRP Short Reference for CRP seeding rates.

[2/] Natural vegetation must be suitable sites where adequate permanent vegetation would be expected to develop. Avoid deep sands, excessively droughty, sodic, low pH/fertility soils.

[3/] Coastal bermudagrass applicable only in Fayette, Hardeman, Hardin, McNairy, and Shelby Counties.

[4/] PLS = Pure Live Seed

[5/] Species may become invasive.

[6/] Switchgrass seed should be at least two years old, if available.